Fossil Insects

National Park Service
U.S. Department of the Interior

Florissant Fossil Beds
National Monument

Bee Fly (Bombyliidae). YPM.IP.102

Scarab Beetle (Scarabaeidae). USNM.90441

Insects are the most numerous and diverse animals alive today. Rarely do insects fossilize, however. The Florissant fossil beds contain an exceptional diversity and abundance of fossil insects, including more than 1,500 species. Read on to see and learn more about these unique specimens.

Why study insects?

Three out of four animals are insects. There are twice as many species of flies (Diptera) as there are of all vertebrates (fishes, birds, reptiles, amphibians, and mammals). Insects live on every continent and play major roles in every ecosystem: they pollinate flowers, eat plants, decompose dead matter, and provide food for many other animals. Many insects spend part of their life cycle as parasites, usually on other insects but occasionally on vertebrates. In order to understand and respond to issues in conservation biology, agriculture, and medicine, we need to know about the animals involved, and insects are some of the most important animals on earth!

Fossil insects show how ecosystems have changed and moved over time. By tracing living species back to their fossil ancestors, scientists can propose explanations for the diversity and distribution of groups of insects found today.

"The collections and study of fossil insects offer an extraordinary opportunity... throwing so much light on the evolution and migrations of insects, and therefore of prime importance for the understanding of the modern fauna."

T.D.A. Cockerell, 1937

Why are fossil insects so rare?

Most bodies decay, erode, or are scavenged before they can become fossils. Softer body material is more fragile and so is less likely to preserve. Teeth and animals with a thick cuticle (hard covering) like weevils are more common as fossils than soft-bodied animals like spiders. Even the most fragile animals can fossilize, however. The gentle lake environment of Florissant in the Late Eocene (34 million years ago) led to the preservation of the delicate insects that lived there.

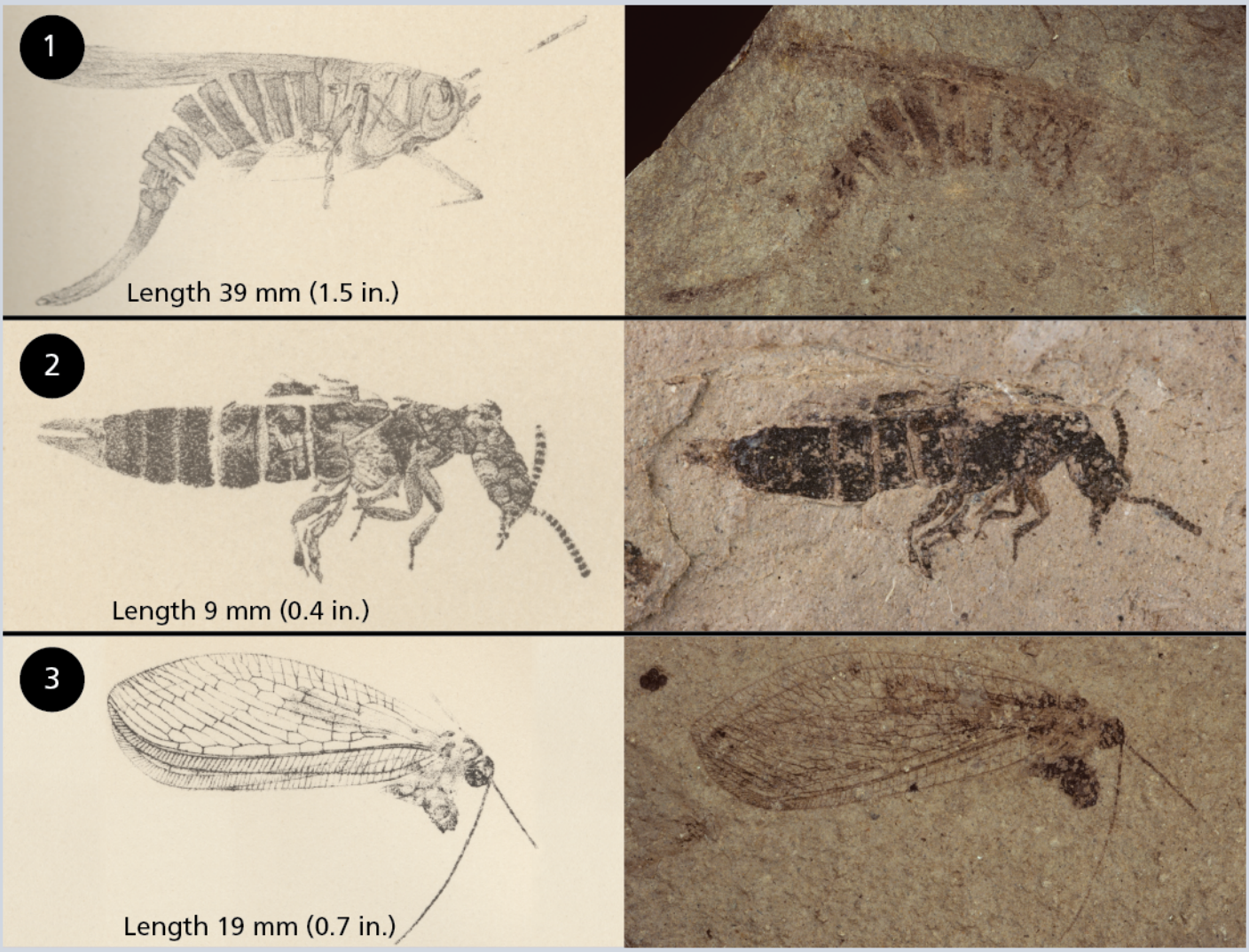
Are fossil species the same as living ones?

Most if not all of the insect species found as fossils at Florissant went extinct in the 34 million years since they were buried. Descendants and relatives of these species survive today, however, and many still live in Colorado.

Insects evolve more slowly than many other organisms do, and many Florissant fossil insects look nearly identical to their living relatives. Fossil insects from older deposits look more different. For example, both modern and Florissant fossil species of green lacewings, snakeflies, and kin usually have clear wings for camouflage. An older, related group called kaligrammatid lacewings had large spots on their wings that probably scared predators away, like some butterfly "eyespots" do today. The kaligrammatid lacewings are known from 165 - 120 million year old fossils.

How many of these Florissant fossil insects can you identify? Answers below.

Samuel Scudder named over 600 species of fossil insects and spiders from Florissant. The sketches on this page were drawn by J. Henry Blake and appeared in Scudder's 1890 book, *The Tertiary Insects of North America*.



Answers: (1) **Katydid** (Orthoptera: Tettigoniidae), MCZ specimen 472. (2) **Earwig** (Dermaptera), USNM specimen PU-6381. (3) **Green Lacewing** (Neuropetera: Chrysopidae), MCZ specimen 249.

Where can I see more?

Anyone can access the database of photographs and records for the several thousand insect and plant fossils from Florissant that have been included in publications. Also, Florissant Fossil Beds National Monument is a participating institution in the Fossil Insect Collaborative, which will add tens of thousands of additional fossil insect records from eight museums to the Integrated Digitized Biocollections database (idigbio.org/portal).

Fossil Insect Collaborative image gallery
fossilinsects.colorado.edu/image-gallery

Florissant Fossil Beds specimen database
planning.nps.gov/flfo/tax3_Search.cfm